

## THE MARITIME FRANSERIA OF THE PACIFIC COAST

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Since Nuttall described *Franseria bipinnatifida* in 1841 it has been accepted generally as being distinct from *F. Chamissonis* Less. In 1907 Dr. Harvey M. Hall suggested that *F. bipinnatifida* was probably not specifically separable from *F. Chamissonis*.<sup>1</sup> However, Dr. Hall and other botanists of the Pacific Coast continued to accord it specific rank, the segregation based primarily on the twice or thrice pinnatifid leaves.

At the suggestion of Dr. L. R. Abrams of Stanford University experimental work was done to test the hypothesis that the races mentioned are variants of one ecospecies.

Through the courtesy of the staff the plants were grown and the cytological work was done at the laboratory of the Carnegie Institution of Washington on the Stanford University campus. Professor James McMurphy of Stanford University very kindly furnished greenhouse space and care for some of the cultures.

Seventeen crosses were made. Five were *F. Chamissonis* on *F. bipinnatifida*, five reciprocal, four *F. bipinnatifida* on *F. bipinnatifida*, and three *F. Chamissonis* on *F. Chamissonis*. In all cases there was some variation in the  $F_1$  progeny. When *F. Chamissonis* and *F. bipinnatifida* were crossed the  $F_1$  hybrids showed as much variation in the small numbers raised as would be expected in  $F_2$  hybrids. One cross was carried on to the  $F_2$  generation. The male parent, *F. Chamissonis*, from Half Moon Bay was collected by Wm. Hiesey; the female parent, *F. bipinnatifida*, was collected by D. D. Keck (no. 2197) five miles north of Cambria. The chromosome number of each was  $2N = 36$ . Two hybrid offspring, intermediate in leaf character, were chosen; one was used as the male and the other as the female parent. The chromosome number of each was  $2N = 36$  and  $N = 18$ . Further,  $M_1$  and  $M_{11}$  were normal and regular. On October 5, 1935, 104 seeds were planted in a flat from which 79 plants were harvested and pressed about June 20, 1936. Of these, 11 had leaves entire, or nearly so; 36 had coarsely cut leaves; and 32 had finely cut leaves.

These tests, as well as field observations, indicate that in most places the maritime *Franseria* is heterozygous and unstable. The leaf form with associated characters is dependent on genetic constitution, and this, of course, is dependent on chance. Maintaining these forms as species does not seem to be justified as they cross freely; one form swamping out the other at times, but both being found from British Columbia to southern California. They have the same chromosome number, both mitosis and meiosis are normal, and cytologically they are indistinguishable. Therefore, the following taxonomic treatment of these subspecies is proposed.

<sup>1</sup> Hall, Harvey M. Univ. Calif. Publ. Bot. 3: 121. 1907.

1. *FRANSERIA CHAMISSONIS* subsp. *typica* nom. nov. *Franseria Chamissonis* Less. *Linnaea* 6: 507. 1831. *Franseria Chamissonis* var. *malvaefolia* Less. *Linnaea* 6: 507. 1831. *Franseria cuneifolia* Nutt. *Trans. Am. Phil. Soc. ser. 2, 7: 345.* 1840. *Franseria Chamissonis* var. *cuneifolia* Torr. & Gray, *Fl. N. Am. 2: 293.* 1842. *Gaertneria Chamissonis* Kuntze, *Rev. Gen. 339.* 1891. *Ambrosia Chamissonis* Greene, *Man. Bay Reg. Bot. 188.* 1894.

Leaves serrate to the cuneate base; bur channeled above.

Sandy coastal regions, San Clemente and San Miguel Islands, and from middle California to Washington.

2. *FRANSERIA CHAMISSONIS* subsp. *bipinnatisecta* comb. nov. *Franseria Chamissonis* var. *bipinnatisecta* Less. *Linnaea* 6: 507. 1831. *Franseria bipinnatifida* Nutt. *Trans. Am. Phil. Soc. II. 7: 344.* 1840. *Franseria Lessingii* Meyen & Walp.; *Walp. Nova Acta Acad. Leop. Carol. 19: Suppl. 268.* 1843. *Gaertneria bipinnatifida* Kuntze, *Rev. Gen. 339.* 1891. *Ambrosia bipinnatifida* Greene, *Man. Bay Reg. Bot. 187.* 1894. *Franseria bipinnatifida dubia* Eastw. *Proc. Calif. Acad. ser. 3, 1: 117.* 1898. *Gaertneria bipinnatifida dubia* A. Heller, *Muhl. 1: 6.* 1900. *Franseria bipinnatifida villosa* Eastw.; *Rydb. N. Am. Fl. 33: 26.* 1922, as synonym. *Franseria villosa* Rydb. *N. Am. Fl. 33: 26.* 1922.

Leaves once to thrice pinnatifid, bur ovoid but more slender than in *typica* with spines sub-terete and usually only slightly channeled above.

Range: British Columbia to Lower California. The South American form seems to be this subspecies or a variant thereof, and may be an introduction.

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## ON THE POLLEN OF THE MIMOSOIDEAE AND THE IDENTITY OF THE SUPPOSED ALGA PHYTOMORULA

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The state of California harbors a few native species of Mimosoideae, together with a large number of introduced species, including about three of *Albizzia* and more than three-score of *Acacia*. It may not be inappropriate to summarize what is known about the remarkable clusters of pollen grains produced by some of the members of the group. The existence of these clusters is no new discovery: it is noted in several of the standard reference works (1, 8, 10, 11); it has been reported for Californian material by Rowe (7); it has been known for more than a hundred years.

I have not been able to confirm a reference to the writings of Köhltreuter. The oldest paper which I have seen that describes these clusters is by von Mohl (4), who distinguished a